3. Citizen (CitMon) and Other Non-Agency Monitoring Programs

(1) Introduction

In 2002, the Virginia General Assembly passed legislation that codified the Virginia Citizen Water Quality Monitoring Program in the Code of Virginia. To meet the requirements of this legislation, The Virginia Department of Environmental Quality (DEQ) refined and upgraded their Citizen Monitoring Program. One fundamental goal of this change in the program was for DEQ to use more citizen monitoring data. In July of 2003, the agency produced a revised version of "The Virginia Citizen Water Quality Monitoring Methods Manual," which outlined the various ways that DEQ would use citizen monitoring data. This manual was updated in 2007 as the Virginia Citizen Water Quality Monitoring Program October 2007 Methods Manual [III-C-3.pdf] and is scheduled for another update in 2013. The newest edition will always be on DEQ's Citizen Monitoring WebPages [http://www.deq.virginia.gov/Programs/Water/WaterQualityInformationTMDLs/WaterQualityMonitoring/CitizenMonitoring/Guidance.aspx],

DEQ continues to improve and promote citizen and other non-agency monitoring efforts. The result is that citizens' groups now provide more data of higher quality than ever before to DEQ. In addition, DEQ receives increasing amounts of data from other non-agency groups such as the private sector and other government agencies. To collect and manage the growing amount of data, DEQ expanded the position of Citizen Monitoring Coordinator to become the Water Quality Data Liaison (WQDL). The WQDL continues to work with citizen monitoring groups while also working with other non-agency groups.

(2) Purpose

A group's objectives in carrying out water quality monitoring are often directed to meeting specific needs of the particular organization involved. This applies to DEQ as well as to citizen and other non-agency monitoring groups. Often, the needs can and will vary among groups. The most commonly occurring needs for monitoring include obtaining background information on a previously unmonitored stream, providing information for local land use decisions/evaluations, education, in response to a specific issue of concern, or for scientific research. As a part of the agency's integrated ambient WQM network, citizen and non-agency monitoring may facilitate the attainment of Objectives A. (1-3, 6), B. (7-9), and C. (13, 14, 17-19) of the WQM Strategy.

(3) Siting

Non-agency monitoring groups generally select sampling sites based upon their own monitoring needs. When appropriate, DEQ may suggest potential monitoring sites to a group. The agency's monitoring staff and the WQDL can assist groups in this manner. Other DEQ resources available to help groups select appropriate monitoring sites include the Virginia Citizen Water Quality Monitoring Program October 2007 Methods Manual [http://www.deq.virginia.gov/Programs/Water/WaterQualityInformationTMDLs/WaterQualityMonitoring/CitizenMonitoring/Guidance.aspx]

(4) Frequency

As with siting, the frequency of monitoring is generally the result of resource availability and the objectives of the group. When applicable, DEQ may suggest a minimum frequency of sampling to a monitoring group, to assure that the results are more useful to the agency. The recommended frequency is generally comparable to the level of monitoring done by DEQ monitoring staff for the biennial 305(b)/303(d) Integrated Water Quality Assessment Report. The Virginia Citizen Water Quality Monitoring Program October 2007 Methods Manual also offers suggestions on the recommended frequency of sampling.

(5) Parameters

When appropriate, DEQ may suggest specific water quality parameters to a group. Recommendations made by DEQ may help the group to satisfy their own needs while also providing data for the assessment of an established Virginia Water Quality Standard. The agency also may suggest suitable sampling methods and test procedures. These suggestions will help both the monitoring group and DEQ get the best use out of the data collected. In addition to this assistance, DEQ staff can and does help groups in developing a Quality Assurance Project Plan (QAPP) that meets DEQ standards. Agency approval of a monitoring group's QAPP is an important step in enabling DEQ to use the data in its biennial 305(b)/303(d) report.

(6) Duration

Most citizen and non-agency groups attempt to monitor a site long enough to meet their own monitoring needs. However, financial resources and volunteer/staff availability may limit the length of time that a group can monitor at a site. When they are able, citizen and other non-agency groups typically monitor at a site for several years. This duration of monitoring often can also provide DEQ with a sufficient dataset for assessment purposes.

(7) Plan and Schedule

DEQ continues to reach out to non-agency groups with several initiatives mentioned elsewhere in this report. The agency hopes to continue increasing its interaction with citizen and non-agency groups in future years.

(8) Current Initiatives

Citizen Nomination Process - Starting in 1999, Virginia began to seek public input to select sites for future DEQ monitoring. This nomination process occurs each year. After receiving a nomination, DEQ regional staffs review each request. Based on their review, DEQ decides to honor the request, or not. If DEQ does not elect to carry out follow-up monitoring, it is usually due to the limited availability of staff or other monitoring resources. On average, DEQ receives around 20 nominations for monitoring and is able to perform follow up sampling at over 60% of the requests.

Citizen Monitoring Grant Program - In 1999, the Virginia General Assembly created the Citizen Water Quality Monitoring Grant Program. The grant program has become an important tool to help DEQ stimulate the collection of higher quality data by citizen groups. As of 2012, the program offers $88,000 per grant year. Recent grant cycles have supported approximately 20 groups with an average award of $4, 000 to each recipient. A review committee, composed of both agency and non-agency members, awards most of these grants on a competitive basis. Regional or statewide groups that support citizen monitoring may receive non-competitive awards providing a more effective means to allocate limited grant funds.

Prior to 2007, the availability and duration of citizen monitoring grants was dictated by the state fiscal year: July 1st through the following June 30th. Because of the timing of the awards and the closeout of the grant period, previous cycles provided for only six to eight months of monitoring. Starting with the 2007 cycle, the grant program shifted funding to cover an entire calendar year. This allows grant recipients to collect data continuously for up to 12 months. As in previous grant cycles, all grant recipients must submit their data to DEQ at the end of the grant period.

Coliscan TMDL Monitoring Project - In 2005, DEQ's Total Maximum Daily Load (TMDL) Program began working with the WQDL to start a citizen monitoring program using Coliscan Easygel. Coliscan is a relatively new way to test for *E. coli* bacteria in water and has some advantages over other methods. One key advantage is that the test costs much less than alternative laboratory analyses. In addition, Coliscan

results are comparable to those of other methods, although they may be slightly less accurate. These traits make Coliscan ideal for many citizen monitoring groups to use.

The advantages in using Coliscan led the TMDL Program to fund a project for equipping selected citizen monitoring groups to collect and test samples using Coliscan. The goal of Coliscan monitoring is to identify areas of high levels of *E. coli* bacteria within specified watersheds. These data then help DEQ staff to evaluate how effectively a TMDL Implementation Plan (IP) is performing in the watershed.

DEQ TMDL staff selected candidate watersheds based on their having an EPA-approved or a pending TMDL Implementation Plan for *E. coli* or fecal coliform bacteria. The WQDL and local DEQ TMDL staff subsequently began to recruit monitoring groups. After receiving training led by the WQDL, the monitors agreed to regularly sample at ten or more sites in the watershed on a monthly basis, and twice following significant rainfalls, to track non-point *E. coli* sources. The results of this monitoring are reported to DEQ for review by TMDL staff.

The success of this program has allowed DEQ to continue supporting projects despite limited funds. With the pending merger of most of the Department of Conservation and Recreation non-point source program into DEQ, continued interest and support for volunteer Coliscan monitoring is anticipated.

Citizen and Non-Agency Monitoring Database - In 2006, DEQ launched an online database to store citizen and non-agency water quality data. The citizen monitoring group Environmental Alliance for Senior Involvement (EASI) helped to develop this database. The database has similar features to the system developed by EASI for the Pennsylvania Department of Environmental Protection.

This database allows citizen and other non-agency groups to send data to DEQ via the Internet. In the past, DEQ received this data by mail or e-mail. The online database allows DEQ staff to review and use data more quickly. Built in QA/QC features, such as alerting users to incorrect sample locations, further help to improve the quality of the data. The public is also able to view and download this data through the Internet. Users can access the system by visiting the DEQ Citizen Monitoring WebPages or by accessing the website directly at www.deq.virginia.gov/easi/.

Citizen and Non-Agency Benthic Macroinvertebrate Monitoring Protocols - In 2006, DEQ developed guidelines for increasing the use of citizen and non-agency benthic macroinvertebrate data. In the past, DEQ staff could not reliably compare non-agency benthic macroinvertebrate results to those of DEQ biologists. This was due to differences among protocols and scoring metrics used by other groups and the agency. Groups may use the DEQ benthic sampling and methodology or they can perform a validation study to compare their method against a DEQ recognized method. Such a validation study evaluates how well the results from a method used by another group compare to the results from the methodology used by DEQ to assess benthic conditions. If the strength of agreement between the results of the two methods is satisfactory, DEQ will have sufficient confidence to justify the use of the non-agency data for 303(d) listing/delisting for benthic impairments.

In 2008, StreamWatch [http://streamwatch.org/] (Rivanna River Basin) performed such a study to compare their method with that used by DEQ. The two methods produced nearly identical results and DEQ has been using StreamWatch data for 305(b) and 303(d) purposes since then. In addition, several consulting and environmental companies have adopted DEQ benthic protocols and regularly submit their data to DEQ to use for assessment.

In the 2010 305(b)/303(d) Integrated Water Quality Report, DEQ announced that 3,499 stream miles were monitored by citizen volunteer groups. In the 2012 305(b)/303(d) IR, that mileage had increased to 3,887 stream miles. This goal was removed in 2012 and there are no current plans to revise or continue the tracking as part of a performance measure.

Online Training for Citizen Volunteers – Due to the increasing staff demands for meeting requests to evaluate and train volunteer groups on monitoring methods, DEQ is developing training videos for the most popular volunteer methods. In January 2013, DEQ released a training video on using the Coliscan Easygel method and it has already received international attention as a useful resource. As of March 1, DEQ has saved nearly 50 man hours in training requests by various volunteers interested in using this method. Plans are being developed to expand the training videos to cover other popular methods found in the Virginia Citizen Water Quality Monitoring Program October 2007 Methods Manual. These videos will be available online either through social media like YouTube or directly from the DEQ citizen monitoring website.

Voluntary NPDES Monitoring Initiative - In addition to seeking additional high-quality citizen monitoring data, DEQ is investigating ways to get more non-agency data from other sources. In 2005, DEQ began to partner with water and wastewater treatment facilities to monitor in streams. Using their own equipment and staff, a facility agrees to voluntarily monitor upstream of their water intake or effluent pipe. The facility then shares this data with DEQ for use in future 305(b)/303(d) reports. Adoption of this imitative with the permitted community has been slow. However, every year DEQ receives more data from water and wastewater authorities to include in the 305(b)/303(d) report.

(9) The Future - 2013 and beyond

Geographic and Parametric Coverage: Because citizen and non-agency groups monitor primarily to attain their own specific objectives, gaps in their geographic and/or parametric coverage are inevitable. A few of the gaps in coverage related to the three major types of citizen and non-agency monitoring are summarized below:

Benthic Macroinvertebrate Monitoring - Some watersheds in Virginia have a limited presence of citizen monitoring data for benthic macroinvertebrates. This is mainly due to the lack of benthic protocols for low-gradient streams (some of which are tidal estuarine streams) in the lower Piedmont and the Coastal Plain. The following major watersheds/drainages have limited citizen and non-agency biological monitoring: Big Sandy; Nottoway / Blackwater / Meherrin; Middle and Lower James; Chesapeake Bay and tidal tributaries; and York watersheds. VASOS has developed and is modifying a low gradient method to produce data of similar quality as found with their high gradient method..

Chemical Monitoring - Citizen and non-agency chemical monitoring is also limited in some watersheds. In many cases, these gaps result from the lack of monitoring groups and/or funding to pay for equipment and analyses. The Big Sandy, Blackwater / Chowan / Meherrin, New, Roanoke, Tennessee, and Upper James watersheds have limited citizen chemical monitoring programs. The Citizen Monitoring Grant Program continues to promote citizen monitoring efforts in these watersheds.

Bacteria Monitoring - Along with the Coliscan TMDL Monitoring Program, citizen and non-agency monitoring for bacteria continues to grow. Most of the groups not using Coliscan submit data to DEQ that is QA/QC approved. The groups are helping to cover the Appomattox, Big Sandy, Middle and Lower James, Potomac, Rappahannock, Shenandoah, Tennessee, and York watersheds. Agency staff assesses this QA/QC approved data the same way as they use bacteria data collected by DEQ. The data have and will

continue to appear in future 305(b)/303(d) reports. In addition, some Coliscan data may help DEQ to find suitable areas to do monitoring

The agency will continue to reach out to new citizen and non-agency groups. Agency staff continues to seek new groups by working with local watershed organizations, regional DEQ and DCR offices, Soil and Water Conservation Districts, public events, and by distributing the Virginia Citizen Water Quality Monitoring Program October 2007 Methods Manual and related brochures.

Initiatives and Goals: In 2006, DEQ set a goal to use citizen monitoring data to assess 3,000 stream miles by the 2010 305(b)/303(d) Integrated Water Quality Assessment Report. Along with some initiatives listed earlier in the report, DEQ is increasing the use of citizen data in the following ways.

Increase Probe Usage - In 2004, DEQ fully approved of a method to measure dissolved oxygen using a modified Winkler titration chemical test kit. This resulted in DEQ being able to use more dissolved oxygen data from citizen monitoring groups. For most other parameters, the agency is unable to use data from chemical test kits because they are much less accurate than the electronic probes used by DEQ. This resulted in the exclusion of much citizen monitoring data from past biennial 305(b)/303(d) reports. In an effort to promote the use of probes, DEQ developed standardized operating procedures and calibration log sheets for monitoring groups using electronic probes. In addition, DEQ encourages Citizen Monitoring Grant recipients to use a portion of the grant award to purchase probes if it will help improve their monitoring program. These resources will allow groups to be more comfortable with using probes and provide more QA/QC approved data for DEQ use.

Follow-up Monitoring- Citizen and non-agency data that are not fully QA/QC approved still can be useful to DEQ. These data can help DEQ to identify areas that need follow-up monitoring. In 2004, DEQ adopted guidance for setting up agency stations where citizen monitoring data indicates potential water quality problems (Waters of Concern). This list of Waters of Concern has been included in each subsequent 305(b)/303(d) Integrated Water Quality Assessment Report.

The 2004 Water Quality Monitoring Consolidated Guidance Memorandum [VII-1a.pdf] and its 2007 Amendment 2, [VII-1c.pdf] outline criteria to prioritize follow-up monitoring by DEQ. Because of resource limitations, DEQ may have to delay monitoring in some Waters of Concern stream segments for up to three years after submitting the final version of a 305(b)/303(d) report. The guidance helps DEQ staff to rank stream segments for inclusion based on several criteria. Higher priority streams for follow-up chemical monitoring are those that have a higher rate of water quality standards violations and at least a specified minimum number of samples. For biological monitoring, high priority streams are those that have a limited number of samples and that include seasonal variability in their results. Refer to Section 7.4.1 (p 36) of the original 2004 document - DEQ Follow-Up Monitoring of Waters of Concern - of the Water Quality Monitoring Consolidated Guidance Memorandum for more specific details.

Resource Availability: The agency's WQDL is helping to strengthen the link between DEQ and citizen and other non-agency monitoring groups. In addition, the WQDL, along with other DEQ staff, provides technical support to many of these organizations. Most of this support comes from DEQ's Central Office located in Richmond. Depending upon staff resources, many of the DEQ Regional Offices provide assistance as well. Usually this involves logistical support or other coordination between Central Office staff and local groups.

Continued support by DEQ is necessary to expand the existing citizen monitoring network. The Citizen Monitoring Grant and Coliscan TMDL Programs have proven to be instrumental in this effort. In addition,

continued outreach to non-agency groups is becoming increasingly important to DEQ's monitoring efforts. High quality citizen and non-agency data can help DEQ focus resources on other, higher priority waters. The net result will be greater monitoring coverage in Virginia.

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